

Evocative and Repertoire-Altering Effects of an Environmental Event

Jack Michael

Western Michigan University

The behavioral effects of environmental events can be classified as evocative when we refer to an immediate but momentary change in behavior, and as repertoire-altering when we refer to a lasting effect that can only be observed when the situation that preceded the event is again present. The stimulus between two responses in an operant chain has an evocative effect in evoking the next response (its effect as a discriminative stimulus) and a repertoire-altering effect in increasing the future frequency of the response that preceded it (its effect as a conditioned reinforcer). New terms are introduced to permit a similar dichotomy of respondent functional relations as well as hybrid relations involving the respondent pairing procedure to develop conditioned reinforcers and punishers, and conditioned establishing operations. The resulting arrangement permits the assignment of a different term to each different behavioral function, and a classification of effects that is mutually exclusive and collectively exhaustive.

It is possible to classify the environmental events that control behavior into several main types, and a single event (for example, the onset of a light) typically functions as more than one of these types. (Skinner discusses this issue in detail in Chapter 14 of *Science and Human Behavior*, 1953; it is also an essential aspect of the material on multiple variables in Chapters 9, 10, and 11 of *Verbal Behavior*, 1957.) In some cases the term referring to an environmental event depends on the function being considered, as when a stimulus change in an operant chain functions both as discriminative stimulus (SD) for the next response in the chain, and as conditioned reinforcement (Sr) for the response that preceded the stimulus change. The fact that the same event has more than one name is sometimes confusing, and it is a further source of confusion that some functions of an environmental event (for example, reinforcement) cannot be assessed during and immediately after the event, but only when the conditions that immediately preceded it are again in effect.

The various relations or behavioral functions can be called *evocative* when we are referring to an immediate but momentary change in behavior. A relation can be called *repertoire-altering* when we are referring to a lasting effect that can only be observed when the situation that preceded the event is again present. The effect of a stimulus change as a discriminative stimulus illustrates the former; the effect of the same stimulus

change as conditioned reinforcement illustrates the latter.

The term *evoke* is useful since it can refer to both operant and respondent relations. In the respondent case it is equivalent to *elicit*, and in the operant case *occasion*, or *increase the probability or strength of*. The term is somewhat unsatisfactory, however, in suggesting only an increase, since some of the relations that will be considered evocative involve decreases. *Evocative or suppressive* would actually be more accurate but also more cumbersome, so for now let us assign to *evoke* and *evocative* a bidirectional implication.

The only well recognized operant evocative relation is the one mentioned above, the discriminative stimulus or SD. The operant repertoire-altering relations are reinforcement and punishment, and each can be further subdivided as unconditioned or conditioned (primary or secondary) in terms of their phylogenic or ontogenic provenance. It is important to note that here *reinforcement* refers to the strengthening effect of an event on the type of behavior that preceded the event. Events that function as reinforcement usually have other effects on the organism as well, but these are neither necessary nor sufficient for the event to be identified as a form of reinforcement. When we say that a food deprived animal's lever pressing response was reinforced with food we are referring only the effect the food had in strengthening lever pressing. Such food may well have

elicited salivation, and conditioned the animal with respect to other stimuli so that these stimuli will also elicit salivation when they next occur, but these respondent relations involving food have nothing to do with our identification of the food as a form of reinforcement. An event that functions as reinforcement for one type of behavior may also function as an *SD* for a different type, but again, this evocative effect is neither necessary nor sufficient for us to call it *reinforcement*. It is only the strengthening effect on the behavior that preceded it that identifies an event as reinforcement.

In the case of respondent relations, distinguishing between evocative and repertoire-altering effects is somewhat more difficult because the same terms and symbols (unconditioned stimulus, conditioned stimulus) typically refer to both kinds of effects. In the Pavlovian conditioning experiment the meat powder that was squirted into the dog's mouth, the unconditioned stimulus, had both an evocative effect in eliciting salivation, and a repertoire-altering effect in

changing the organism's tendency to salivate the next time the conditioned stimulus (for example, a tone) was presented. It would probably increase the effectiveness of our verbal practices if separate terms were available for respondent evocative and repertoire-altering relations, as with the *SD* and *Sr* operant relations. The unconditioned stimulus (*US*) really has two quite different effects on an organism: It is an *unconditioned elicitor (UE)* for an immediate response, and an *unconditioned conditioner (UC)* in that it alters the organism's future response to any stimuli that it was paired or correlated with.

If there is any substantial higher order respondent conditioning (as there probably is with humans) it is not unreasonable to subdivide the *CS* into *CE* and *CC* on the same basis as with the *US*. For Pavlov's dog, the tone functioned as *CE* in that it elicited salivation (after it had been paired with the meat powder), and as *CC* to the degree that it changed the organism's tendency to salivate the next time any stimulus that had accompanied the *CC* occurred alone.

Table 1.
Evocative and repertoire-altering effects.

		RESPONDENT	OPERANT	HYBRID
E V O C A T I V E	UNCONDITIONED (PHYLOGENIC)	UE	UEO	
	CONDITIONED (ONTOGENIC)	CE	CEO SD	
R E P E R T O I R E	UNCONDITIONED (PHYLOGENIC)	UC(CE) SN	SR SP SN	UC(S ^r) UC(S ^p) UC(CEO) SN
	CONDITIONED (ONTOGENIC)	CC(CE) SN	S ^r S ^p SN	CC(S ^r) CC(S ^p) CC(CEO) SN

In addition to the relations mentioned thus far there are some respondent-operant mixtures or *hybrid* relations that must be considered. When a stimulus event that functions as reinforcement (either unconditioned or conditioned) is systematically correlated (or paired) with some other stimulus event, the latter becomes capable of functioning as reinforcement in its own right—at least for a while. The procedure—correlating stimuli—is the procedure of respondent conditioning, but in the present case the evocative effects of the stimuli are not at issue: The effectiveness of the previously neutral stimulus in increasing the future strength of the type of behavior that precedes it, its effectiveness as a form of reinforcement, is the aspect of the organism's repertoire that has been altered. Naturally this extension must be applied to the development of stimulus events as conditioned punishment and, as discussed below, as conditioned establishing operations, as well as conditioned reinforcement.

It thus seems that the unconditioned conditioner concept should be qualified in terms of what is being developed, a conditioned elicitor (CE), a form of conditioned reinforcement (S^r) or conditioned punishment (S^p), or a conditioned establishing operation (CEO). A convenient symbolic system is to add (CE), (S^r), (S^p), or (CEO) as a qualifier for the UC; thus UC(CE) refers to the effect

of a stimulus event in developing a new conditioned elicitor; UC(S^r) refers to the effect of a stimulus event in developing a new form of conditioned reinforcement, and so on. With this notation, the UC identifies the pairing or correlating procedure, and the symbol in parentheses indicates the new behavioral relation developed as a result of this procedure.

With these terminological changes the various relations can be represented in a three-by-two table as shown in Table 1. The unconditioned and conditioned establishing operations (UEO and CEO) that are described in detail elsewhere (Michael, 1982; Michael, in preparation) have been included for the sake of completeness. One should also add to the repertoire-altering relations the effect of uncorrelating stimuli or presenting a neutral stimulus (S^N), which undoes whatever was accomplished by correlating or pairing.

REFERENCES

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